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Results of a national survey on the diagnosis of heart failure in nephrology clinics: a call to action

Resultados de una encuesta nacional sobre el diagnóstico de la insuficiencia cardiaca en las consultas de nefrología: hora de actuar

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ABSTRACT

Introduction: Heart failure (HF) is a common comorbidity with a major prognostic impact in patients with chronic kidney disease (CKD). However, screening and diagnostic practices for HF in nephrology clinics are not optimized. The aim was to assess routine clinical practice and identify gaps in HF diagnosis in the care of patients with CKD at any stage.
Methods: A nationwide survey of Spanish nephrologists was conducted using an electronic questionnaire. Data collection took place over a two-month period.
Results: A total of 73 centers completed the questionnaire. The estimated prevalence of HF among the patients seen was 44.1%, although only 30% of these cases were thought to be documented in the medical record. Although 55.4% of respondents reported performing active screening, the use of diagnostic tools such as echocardiography, natriuretic peptides, and electrocardiography was variable and often conditioned by the presence of symptoms.
Conclusion: These findings support a call to action based on the need to implement protocolized, multidisciplinary strategies to optimize HF diagnosis, as well as the early initiation of appropriate therapies for HF in patients with chronic kidney disease.

Palabras clave:
Enfermedad renal crónica
Insuficiencia cardiaca
Cribado
Síndrome cardiorrenal

RESUMEN

Introducción: La insuficiencia cardiaca (IC) es una comorbilidad frecuente y de gran impacto pronóstico en pacientes con enfermedad renal crónica (ERC). Sin embargo, las prácticas para el cribado y diagnóstico de la IC en las consultas de Nefrología no están optimizadas. El objetivo fue evaluar la práctica clínica habitual y detectar lagunas en el diagnóstico de IC en la atención a pacientes con ERC en cualquier estadio.
Métodos: Se realizó una encuesta nacional a nefrólogos españoles a través de un cuestionario electrónico. La recogida de datos se realizó durante dos meses.

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Resultados: Un total de 73 centros completaron el cuestionario. La prevalencia estimada de IC entre los pacientes atendidos fue del 44,1 %, aunque se estimó que solo el 30 % de estos casos estaban documentados en la historia clínica. Aunque el 55,4 % de los encuestados refirió realizar cribado activo, el uso de herramientas diagnósticas como la ecocardiografía, los péptidos natriuréticos y el electrocardiograma fue variable y con frecuencia condicionado a la presencia de síntomas.
Conclusión: Estos resultados sugieren la conveniencia de avanzar hacia estrategias protocolizadas e interdisciplinares que optimicen el diagnóstico de la IC, como en la instauración precoz de terapias adecuadas para la IC en pacientes con enfermedad renal crónica.

Introduction

Heart failure (HF) and chronic kidney disease (CKD) frequently coexist due to common pathophysiological mechanisms and shared risk factors; this copresentation is also referred to as cardiorenal syndrome.[1,2] In the general population, the prevalence of HF is estimated to be approximately 1–2% but reaching up to 10% in people older than 70 years.[3] Data from the Atherosclerosis Risk In Communities (ARIC) study revealed that compared with individuals with normal renal function, individuals with an estimated glomerular filtration rate (eGFR) < 60 mL/min/1.73 m^2 have almost double the risk of developing HF.[4] Recent studies have shown that more than 90% of patients with advanced CKD are in stage B or C HF, even those without a prior diagnosis.[5] HF is associated with increased mortality and hospitalization in patients with CKD, with underdiagnosis documented in national registries such as the Heart And Kidney Audit (HAKA) or CARDIOREN.[6,7] Therefore, early detection of HF in patients with CKD is key to improving their outcomes, but nephrology services lack standardized screening and diagnosis methods. In addition, early diagnosis necessitates more than the identification of clinical signs of heart congestion and requires a multiparametric evaluation that includes morphological and functional echocardiographic criteria, as well as the use of biomarkers as indicated in the current guidelines for the diagnosis and management of HF.[8,9] HF remains underdiagnosed and, consequently—despite the availability of prognosis-modifying treatments—undertreated in this population. Some studies have shown that in patients with comorbidities such as CKD, even when HF is clinically suspected, it is not formally recorded in the clinical history, which contributes to therapeutic inertia and worsening prognosis.[6,10]

This diagnostic and therapeutic gap is also reflected in the results of the HAKA study,[6] which evaluated 5,012 patients with advanced CKD in 29 Spanish centers. In that study, only 13% of patients had a diagnosis of HF, with high intercenter variability (range of 2 to 44%), which suggests a concerning rate of underdiagnosis. In addition, only 9.3% of patients with HF with reduced ejection fraction (HFrEF) received optimal treatment with the four recommended therapeutic classes of drug (although the therapeutic failure rate is probably distorted by the limitation of the use of some drugs, such as mineralocorticoid receptor antagonists with an eGFR < 30 mL/min/1.73 m^2), and none of the patients with grade 5 CKD reached the goal of an optimized treatment according to their eGFR and the guidelines in operation at the time. The undertreatment rate is especially important in patients with CKD and HF with preserved or slightly reduced ejection fraction.

The problem is not unidirectional, since CKD also continues to be underdiagnosed in patients with established HF. In this sense, the CARDIOREN registry has revealed a high prevalence of CKD in patients with HF and the limited application of evidence-based therapies.[2]

Given the scarcity of studies that analyze how HF is evaluated in patients with CKD, we decided to conduct a national survey with the objective of identifying the clinical patterns followed by nephrologists in Spain.

Materials and methods

An anonymous (with the option of voluntary identification) online survey was designed and distributed among the members of the Spanish Society of Nephrology (Sociedad Española de Nefrología, S.E.N.). The questionnaire consisted of closed questions focused on demographic data, the care setting, the estimated prevalence of HF in the population treated in nephrology departments, the tools used for diagnosis, the presence of cardiorenal units and the most frequently associated comorbidities (Appendix B, Supplementary Table S1).

Similarly, items on the frequency of use of diagnostic techniques (echocardiogram, electrocardiogram, and natriuretic peptides), clinical assessment practices and recording the diagnosis of HF in the clinical history were included. Data collection was carried out over a period of two months. A descriptive analysis was performed, and the results are presented as percentages or means and standard deviations, as appropriate. To explore differences between groups, chi-square tests were applied for categorical variables. In addition, an exploratory analysis was carried out using binary logistic regression to identify possible factors associated with active HF screening, including age, sex, the presence of a cardiorenal unit in the center and the number of patients treated monthly as independent variables.

All the statistical analyses were performed with Stata v14.0 (StataCorp, College Station, TX, USA).

Results

A total of 74 nephrologists belonging to 73 centers completed the survey. More than half of the participants (55.4%) provided care in centers with cardiorenal units, which is especially relevant to the objective of the study. The mean age of the respondents was 47.1 (SD 10.9) years, and 73% were women, in line with the feminization of the specialty as described by the S.E.N.

Most of the respondents were from the Community of Madrid (20.3%), Castilla y León (14.9%) and Andalusia (10.8%), followed by Castilla-La Mancha (9.5%), Galicia (8.1%), Catalonia (6.8%), the Canary Islands (6.8%) and the Valencian Community (6.8%); compared with that of the general population (according to the National Institute of Statistics), this distribution was significantly different ($\chi^2 = 33.97$; $p = 0.005$), with overrepresentation of some communities and underrepresentation of others (Fig. 1). Similarly, a comparison with the distribution of SEN members also revealed statistically significant differences ($\chi^2 = 28.17$; $p = 0.02$); notably, Castile and León and Castile-La Mancha were overrepresented, and Andalusia, Catalonia and the Valencian Community were underrepresented. No nephrologist from Cantabria participated in the survey despite the region having members in the SEN.

The estimated mean number of patients treated monthly by each respondent was 135.8 (SD: 81.3). The analysis of the areas of care activity of the respondents revealed that the majority worked in more than one area of nephrology. Specifically, 59.5% reported working in more than one area, with the most frequent combination being care for patients on dialysis and with advanced CKD (ACKD) (16.2%), as well as outpatient care, dialysis and ACKD (5.4%). The estimated

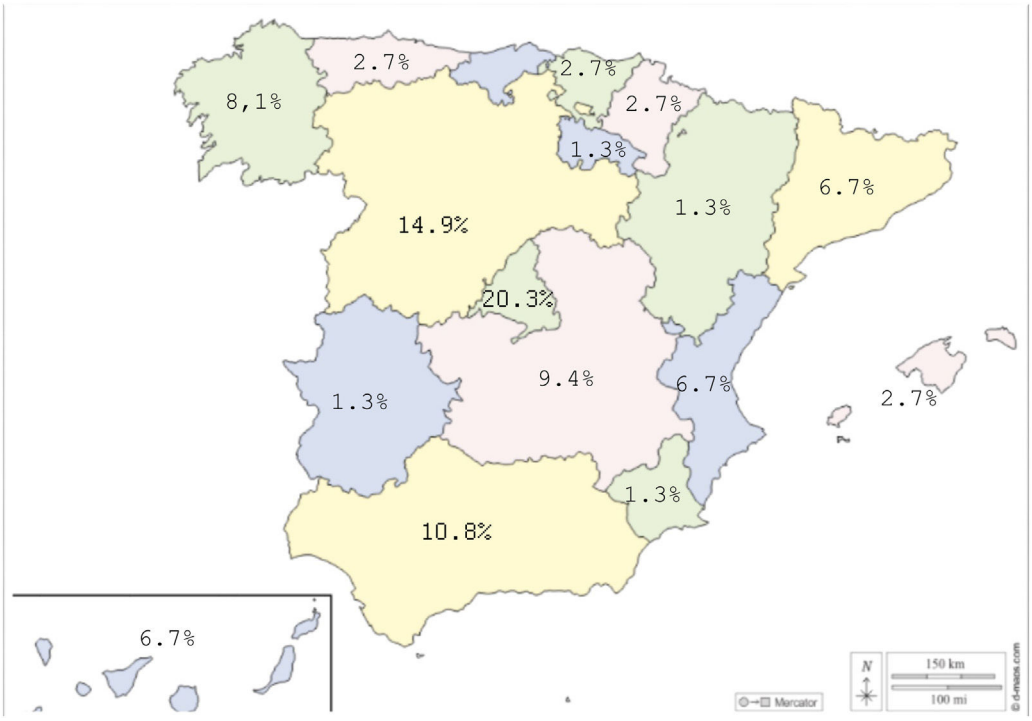

Figure 1. Geographical distribution of respondents in Spanish autonomous communities.
This map illustrates the percentage of total survey responses originating in each autonomous community.

Table 1
Frequencies of use of diagnostic tools.

Diagnostic tool	Always (%)	If symptomatic (%)	Never (%)
Electrocardiography	45.9% (n = 34)	50.0% (n = 37)	4.1% (n = 3)
Echocardiography	43.2% (n = 32)	47.3% (n = 35)	9.5% (n = 7)
Natriuretic peptide tests	28.4% (n = 21)	64.9% (n = 48)	6.8% (n = 5)

The percentages reflect the frequency of use reported by nephrologists in Spain. Multiple responses per category can be selected.

prevalence of HF in patients seen in nephrology consultations was 44.1%, although only 30% of these cases were documented in the medical history.

Regarding diagnostic practices, 55.4% reported that they actively investigated the presence of HF, whereas 44.6% did so only if the patient presented with suggestive symptoms. The use of diagnostic tools was variable: ECG was used routinely in 43.2% of cases and only in those with symptoms in 50% of cases; echocardiography was routinely used in 43.2% and only in those with symptoms or elevated natriuretic peptides in 47.3%; and natriuretic peptide tests were routinely requested in 28.8% and only in those with symptoms or electrocardiographic or echocardiographic abnormalities in 64.8% of cases. With respect to systematic clinical assessments, histories were taken for 93.2% of the patients at each visit, and 83.8% underwent physical examinations (Tables 1 and 2).

No significant differences were observed in terms of attitudes toward HF screening among the centers except in the routine determination of natriuretic peptides, which was much more frequent among nephrologists who worked in centers with a cardiorenal unit (39% vs. 15%, p = 0.049).

In an additional exploratory analysis, a greater number of patients treated monthly was associated with a significantly higher probability of performing active HF screening (p = 0.001), whereas no significant associations were observed for age, sex and the presence of a cardiorenal unit in the center. These findings suggest that contact with a greater number of patients may favor the implementation of systematic HF screening strategies.

Table 2
Frequencies of clinical evaluation during follow-up.

Clinical evaluation	At each visit (%)
Anamnesis	93.2% (n = 69)
Physical examination	83.8% (n = 62)

These figures represent the proportion of nephrologists who systematically employed these evaluations during follow-up visits.

Discussion

This survey revealed important heterogeneity in the diagnostic approach to HF, which contributes to the relevant underdiagnosis in this population. Although approximately half of patients are estimated to have HF, in many cases, the diagnosis is not included in the medical history. This variability can be attributed to several factors, including the lack of standardized and specific protocols for the screening and diagnosis of HF in patients with CKD, differences in the training and experience of nephrologists, the availability of diagnostic resources, and therapeutic inertia.

These findings coincide with those of the HAKA study,[6] which revealed a low rate of HF diagnosis in patients with CKD and the limited implementation of treatments that could affect patient outcomes. Although symptoms or compatible echocardiographic findings were identified, the lack of a formal diagnosis highly

influenced therapeutic decisions, especially in patients with preserved ejection fraction. The great intercenter variability in the diagnosis of HF (2–44%) observed in this study reinforces the need for standardized protocols. The discrepancy in the prevalence of HF (13% in HAKA versus an estimated 44% in our survey) can be explained, at least in part, by the nature and population of each study. The HAKA was based on a multicenter retrospective registry of patients with advanced CKD with a documented diagnosis in their clinical history, while our survey collected the data of the surveyed nephrologists on the prevalence of HF in their consultations, covering different areas of care (dialysis, ACKD, hospitalization, transplantation and outpatient consultation). Thus, the 44% prevalence reflects the overall perception of clinicians more than a formal recording of cases, which could explain the observed difference.

The diagnosis of HF in this population is relevant because it suggests the possibility of applying evidence-based therapies that could improve the prognosis of the disease. Numerous studies have shown that treatments such as sodium–glucose cotransporter type 2 (SGLT2) inhibitors and mineralocorticoid receptor antagonists improve the outcomes of patients, even those with CKD.[10,11] Failure to identify HF therefore implies a risk of worsening patient outcomes.[12]

Although 55.4% of the respondents reported working in centers with cardiorenal units, this did not translate into systematic screening or consistent diagnostic practices. This finding highlights the fact that structural availability is a necessary but not sufficient factor to guarantee the real integration of multidisciplinary protocols. Complementing the infrastructure with continuing education programs is essential for nephrologists to improve their knowledge of the pathophysiology, diagnosis and treatment of HF in patients with CKD. Similarly, it is essential to establish mechanisms of care coordination that facilitate communication and collaboration between nephrologists and cardiologists, not only with the creation of cardiorenal units but also by implementing screening and automatic alert systems that have previously been proven useful in selected areas. For example, screening according to natriuretic peptide levels has proven to be a promising tool for the early detection of ventricular dysfunction and the stratification of cardiovascular risk in the general population and could be adapted for patients with CKD.[13,14] The results of a national, multicenter study, recently published by de la Espriella et al.,[5] support the integration of the structured evaluation of HF and screening based on N-terminal pro-B-type natriuretic peptide (NT-proBNP) in routine nephrology care. That multicenter study, conducted in a population with advanced CKD without a previous diagnosis of HF and treated through nephrology consultations, revealed that a substantial proportion of this population was already in stage B (53.3%) or C (38.6%) of HF. The study proposed an algorithm for the use of NT-proBNP in the diagnosis of HF in outpatients with advanced CKD, wherein an NT-proBNP level <125 pg/mL indicates a low probability of significant cardiac abnormalities, an NT-proBNP level >500 pg/mL increases the likelihood of cardiac abnormalities and justifies further study, and markedly elevated levels of NT-proBNP ($>2{,}000$ pg/mL) represent a high-risk subgroup that may justify rapid cardiological referral.

Additionally, echocardiography is a key tool for characterizing HF phenotypes in patients with CKD, allowing the detection of structural and functional alterations even in subclinical phases. In addition, the incorporation of relatively simple techniques such as echocardioscopy or focused cardiac ultrasound (FoCUS), which are increasingly accessible during nephrology consultations, could facilitate broader and more systematic screening, especially in environments with limited access to formal echocardiographic studies. Notably, the morphological and functional parameters used to diagnose HF may need to be adjusted for patients with advanced CKD because of the high prevalence of structural heart disease, since the clinical presentation is dependent on the volemic status of blood and the response to renal replacement therapy. In this sense, Chawla et al.[15] proposed a specific functional classification for this population on the basis of adapted echocardiographic criteria. This approach reinforces the need to provide nephrologists with skills in basic cardiac imaging.[16]

In addition to the value of natriuretic peptides and echocardiography for screening the population at risk, this survey also revealed significant heterogeneity in the choice and frequency of use of other diagnostic tools, despite widespread knowledge of their importance. This finding reinforces the need to establish clinical pathways that integrate HF screening into routine nephrology care, regardless of the preferences of the professional or the traditions of the center. In this context, the incorporation of prognostic scales such as the Charlson comorbidity index, the Prevent test or the Kidney Failure Risk Equation (KFRE) can provide added value by allowing better stratification of cardiovascular risk and renal progression, facilitating proactive, more personalized care.[17]

The KDIGO 2024[18] guidelines on the evaluation and management of CKD recommend a comprehensive assessment of cardiovascular risk, including HF screening based on natriuretic peptides and echocardiography “when clinically indicated”. However, this recommendation is vague and does not specify criteria for such screening, which limits its applicability in daily clinical practice and could result in variability in the diagnostic approach. In this sense, the results of the survey reflect the lack of systematization in the screening of HF in patients with CKD, since only 55.4% of the respondents reported actively investigating the presence of HF, while 44.6% do so only in the face of suggestive symptoms. In addition, the use of diagnostic tools such as echocardiography and natriuretic peptide tests was variable and often dependent on the presence of symptoms. These findings suggest that many nephrologists are not performing systematic screenings for HF in all patients with CKD, which could lead to an underdiagnosis of the disease. To improve the implementation of the KDIGO guidelines in clinical practice, it is necessary to develop more specific and detailed recommendations on HF screening in patients with CKD, including clear clinical and biochemical criteria, to identify patients who would benefit from a more comprehensive evaluation.

The results of this survey suggest several future lines of research. First, it would be desirable to develop prospective multicenter studies that evaluate the impact of implementing systematic screening protocols for HF in nephrology consultations. These studies could compare different screening strategies (for example, universal screening versus selective screening based on risk factors) and evaluate their effects on the early diagnosis of IC, the initiation of evidence-based treatments and long-term clinical outcomes (mortality, hospitalization, quality of life). Second, interventions are needed to evaluate whether the results of establishing models of structured collaboration between nephrology and cardiology are generalizable.[19] These models should include multidisciplinary cardiorenal units, as well as specific clinical decision support tools for patients with CKD and HF (screening programs, automatic alerts, etc.) with the aim of standardizing practice and improving the quality of care.

This survey provides new information on actual nephrology practice with respect to the screening and diagnosis of HF in patients with CKD on the basis of a nationally representative sample. Among the strengths of this survey are the structured approach and the analysis of variability in clinical practice. However, as a self-report survey, it is possible that recall or desirability biases exist. In addition, the unequal distribution of responses by respondents from autonomous communities may limit the territorial generalization of the results.

This study also has its strengths, such as its analysis of data from throughout the country, the structured approach of the questionnaire and the inclusion of a large number of centers, which allows the determination of a global perspective of clinical practice regarding the

diagnosis of HF in patients with CKD. However, certain limitations should also be considered: as the study involved a self-report survey, the results are estimated and susceptible to recall or desirability biases, and the territorial distribution of the respondents is unequal, which limits the representativeness of the sample and the generalization of the results at the national level. Although the multicenter nature of the study provides value, the overrepresentation of certain autonomous communities and the absence of others requires the extrapolation of the findings to be interpreted with caution. Another relevant limitation is that analytical or clinical parameters such as the eGFR or urine albumin/creatinine ratio (UACR) were not collected, which would have allowed stratification of the prevalence of HF according to the stage of CKD. Therefore, the value of 44.1% reported should be interpreted as an overall estimate of nephrology clinical practice in Spain and not as a prevalence adjusted for the stage of CKD.

In summary, the results of this study suggest that the estimated prevalence of undiagnosed HF could be very high. In addition, there is an important lack of homogeneity in the screening of HF in the population with CKD treated in nephrology consultations, which has important clinical implications, notably, the limitation of access to treatments with proven benefits to patient outcomes.

To improve the diagnosis of HF in patients with CKD, it is necessary to implement strategies that increase awareness of the disease among nephrologists, improve their ability to identify high-risk patients and facilitate access to diagnostic tests such as echocardiography and natriuretic peptides.

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Declaration of competing interest

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Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:https://doi.org/10.1016/j.nefroe.2026.501433.

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